

B.TECH DEGREE EXAMINATIONS: NOV / DEC 2010

Sixth Semester

BIOTECHNOLOGY

U07BT603: Protein Engineering

Time: Three Hours

Maximum Marks: 100

Answer all Questions:-

PART A (10 x 1 = 10 Marks)

1. Chou-Fasman method is used to predict the ----- of proteins
(a) Primary structure (b) Secondary structure (c) Tertiary structure (d) Quaternary structure.
2. If a protein has 9 Lysines and 7 arginine residues, digestion with trypsin should yield
(a) 20 peptide fragments (b) 25 peptide fragments
(c) 17 peptide fragments (d) 10 peptide fragments.
3. Which amino acid absorbs Light at wavelength 280nm?
(a) Cysteine (b) tryptophan (c) lysine (d) arginine.
4. ----- Method is for analyzing the tertiary structure of proteins.
(a) CD spectrometer (b) threading (c) sequencing (d) UV analysis.
5. ----- is the method to identify the N-terminus residue.
(a) Damsyl Chloride (b) Silver staining (c) Ninhydrin method (d) Hydrazinolysis.
6. Proteolytic enzymes which liberate single amino acid from the carboxy ends of polypeptide chain
(a) Carboxypeptidase (b) Amylases (c) Proteases (d) Helicases.
7. The problem of involatibility of a protein or pepetide in MS is overcome by
(a) Fast atom bombardment-MS (b) Electronspray ionization MS
(c) Field Desorption (d) Plasma desorption.
8. Rotation of proteins can be measured by
(a) Fluorescence depolarization (b) Gel filtration (c) UV absorbance (d) SDS PAGE
9. The number of disulfide bonds in Insulin.
(a) One (b) Two (c) Three (d) eight
10. The active site of lysozyme have two groups -----
(a) Glu35 and Asp52 (b) Glu45 and Asp78 (c) Glu56 and Asp98 (d) Glu25 and Asp52

PART B (10 x 2 = 10 Marks)

11. Write the significance of peptide bond in proteins.
12. Name the different methods to elucidate the protein structure.

13. Why do Glycine and Proline residue often occur in irregular portions of globular protein structure?
14. What are non-standard amino acids? Give an example.
15. What is protein denaturation? Give any two methods of denaturation.
16. How is Cyanogenbromide used in the analysis of protein structure?
17. What are the structural features of membrane proteins? Give examples.
18. What are ribozymes?
19. What is site directed mutagenesis? Give its application.
20. How will you design a recombinant protein?

PART C (5 x 14 = 70 Marks)

21. (a) (i) Explain how protein structures can be elucidated using X-ray diffraction method. (8)
 (ii) Why does hydrogen bonds are more stable in protein folding. (6)
 (OR)
 (b) (i) What is a covalent bond? Explain any two covalent bonds existing in protein architecture with examples. (6)
 (ii) Explain the principle of NMR in studying the structural properties of proteins. (8)
22. (a) (i) Explain in detail the steps involved in peptide synthesis. (10)
 (ii) How is the Ramachandran plot used in identifying the confirmation of proteins. (4)
 (OR)
 (b) (i) Sketch the titration curve for any one amino acid. (6)
 (ii) Outline the different posttranslational modifications of proteins and functions contributed by them with specific example. (8)
23. (a) What is super secondary structure? Write in brief about the different types of super secondary structures in proteins with suitable examples?
 (OR)
 (b) (i) What is triple helix? Explain with collagen as example. (8)
 (ii) Explain peptide sequencing by Edman degradation. (6)
24. (a) Discuss in detail the three types of motifs of eukaryotic transcription factors.
 (OR)
 (b) (i) Explain the architecture of heavy and light chains in Immunoglobulin G. (8)
 (ii) What are the essential residues involved in catalysis of serine proteases and outline its catalysis mechanism. (6)
25. (a) (i) Describe the various methods used in engineering the proteins. (8)
 (ii) What is de nova protein design? Explain. (6)
 (OR)
 (b) (i) Explain how aggregation and inactivation of recombinant insulin is achieved. (10)
 (ii) List out the advantages of Protein engineering. (4)
